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Mass testing of university students for covid-19

The case for regular PCR testing of all students remains strong

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People can clearly incubate and transmit SARS-CoV-2 in the absence of symptoms.[1] Nonetheless, the value of mass testing (large scale asymptomatic screening to identify cases) has been contested.[2,3] In principle, isolation of people with pre-symptomatic or asymptomatic SARS-CoV-2 infection will prevent further spread. In practice, it is less clear whether enough infectious people can be identified through screening to have a quantitatively important effect on transmission, and whether the direct benefits of enhanced case ascertainment are outweighed by direct or indirect costs. The debate is complicated by an absence of data from randomised controlled trials, and controversy about the suitability of lateral flow tests for this purpose.[4,5]

Students in higher education are at increased risk of SARS-CoV-2 infection because of their shared accommodation, abundant social contacts, low priority for vaccination, and potential for vaccine hesitancy.[6,7] At the same time, universities have been at the forefront of research on covid-19. It is therefore instructive to consider how these institutions have sought to control transmission among their students.

As well as promoting vaccination, testing students with symptoms, and contact tracing, many universities in the UK and North America have implemented programmes to screen for asymptomatic and pre-symptomatic cases using weekly or twice weekly laboratory based PCR tests. Data from these programmes are now available from institutional websites, preprints, and peer reviewed publications. What can they teach us about mass testing for SARS-CoV-2?

The evidence suggests it is possible to sustain high levels of adherence to regular, voluntary, asymptomatic screening using nose and throat swabs.[8,9] University led testing programmes have been strongly supported by students,[8,10,11] providing reassurance at a time when student mental health and wellbeing have been severely affected by the pandemic.[8,12]

The data also show that mass testing can markedly increase case ascertainment, including a substantial proportion of people who have yet to develop symptoms (pre-symptomatic infection).[9,13-15] During certain stages of the pandemic, some universities detected more students with SARS-CoV-2 infection through asymptomatic screening than through symptomatic testing.[14-16] Provided these students are supported to self-isolate, it is reasonable to infer a substantial reduction in ongoing transmission.

PCR testing seems ideally suited to regular screening of defined populations, since high test sensitivity minimises the risk of false negative results and samples are available for genomic sequencing.[17] In a university context, laboratory and logistical infrastructure can be planned in advance, turnaround time minimised, and swab or sample pooling used to reduce costs and demands on testing capacity, particularly when incidence is low.[9,15,18] False positive results can often be reduced by a two-step testing strategy, whereby a positive screening test result is followed routinely by a confirmatory PCR test.[9] Regular, frequent screening is essential to ensure that infected people are detected early, while they are still infectious, so that self-isolation is justified and effective.

What, then, are the remaining unknowns—and how can success be measured? Evidence about secondary behavioural changes, which may partially offset the benefits of enhanced case detection, remains limited. This is a particular concern for programmes based on lateral flow tests because false negative results are more common and good evidence of sustained adherence to twice weekly home testing is lacking.[19] In addition, it is unclear how vaccination will affect participation in voluntary mass testing. Screening programmes must therefore monitor both participation rates (how many people are screened and how often) and the fraction of all cases ascertained by mass testing.

Countries with high levels of vaccination are generally rolling back non-pharmaceutical interventions designed to limit case numbers such as social distancing and face masks. At the same time, the relative benefits of identifying and isolating contacts have been reduced, because transmission rates are lower when index cases or their contacts have been vaccinated.[20,21] Nonetheless, the emergence of new SARS-CoV-2 variants means that large outbreaks may still occur in vaccinated populations.[22]

Compared with other interventions, asymptomatic screening offers several advantages. Critically, it is focused on the identification and isolation of cases rather than contacts; it need not affect the freedom of individuals (provided testing is informed and voluntary); and the costs of each programme are direct and quantifiable, with few indirect economic consequences.

As long as pandemic control measures are required, a strong argument exists for mass testing of populations at high risk of infection, such as students in higher education. Faced with spread of the delta variant, many universities have committed to continuing their programmes of regular PCR based screening of asymptomatic students. When prevalence declines, surveillance testing (regular screening of a fraction of the relevant population)

and genomic sequencing to identify new variants of concern may be a proportionate response, and universities will again be ideal laboratories to test the coherence and effectiveness of these approaches.

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